



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER OF PATENTS AND TRADEMARKS  
Washington, D.C. 20231  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/852,994	05/10/2001	Berthold N. Schmidt	721-1000	5821

7590

01/16/2003

William M. Lee, Jr.  
Lee, Mann, Smith, McWilliams, Sweeney & Ohlson  
P.O. Box 2786  
Chicago, IL 60690-2786

EXAMINER

LEUNG, QUYEN PHAN

ART UNIT PAPER NUMBER

2828

DATE MAILED: 01/16/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

09/852,994

Applicant(s)

SCHMIDT ET AL.

Examiner

Quyen P. Leung

Art Unit

2828

-- **Th MAILING DATE of this communication appears on the cover sheet with the correspondence address --**  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 29 October 2002.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-13 is/are pending in the application.
- 4a) Of the above claim(s) 11-13 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-10 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

**Priority under 35 U.S.C. §§ 119 and 120**

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) \_\_\_\_\_.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_.

**DETAILED ACTION**

***Election/Restrictions***

1. Applicant's election with traverse of group I in Paper No. 6 is acknowledged. The traversal is on the ground(s) that "the examiner asserts that a waveguide laser diode can be made without mirrors... is erroneous. To make the point abundantly clear, claim 11 has been amended above". This is not found persuasive because the examiner only asserted that the process as claimed can be used to make another product. The examiner had to show either that the process as claimed can be used to make another product or that the product as claimed can be made by another and materially different process. It is noted that the change to claim 11 (in paper #6) was to the preamble of the process claim and not to the steps of the process claim. In none of the steps of the method claim is there recited a step for forming mirrors. So the process as claimed can be used to make a different product, such as a light emitting device which does not require the mirrors. In any case, the product as claimed can be made by another and materially different process, e.g. one that requires forming a semiconductor body.

The requirement is still deemed proper and is therefore made FINAL.

***Claim Rejections - 35 USC § 112***

2. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

3. Claims 4, 6-8 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

A broad range or limitation together with a narrow range or limitation that falls within the broad range or limitation (in the same claim) is considered indefinite, since the resulting claim does not clearly set forth the metes and bounds of the patent protection desired. Note the explanation given by the Board of Patent Appeals and Interferences in *Ex parte Wu*, 10 USPQ2d 2031, 2033 (Bd. Pat. App. & Inter. 1989), as to where broad language is followed by "such as" and then narrow language. The Board stated that this can render a claim indefinite by raising a question or doubt as to whether the feature introduced by such language is (a) merely exemplary of the remainder of the claim, and therefore not required, or (b) a required feature of the claims. Note also, for example, the decisions of *Ex parte Steigewald*, 131 USPQ 74 (Bd. App. 1961); *Ex parte Hall*, 83 USPQ 38 (Bd. App. 1948); and *Ex parte Hasche*, 86 USPQ 481 (Bd. App. 1949). In the present instance,

Claim 4 recites the broad recitation "the metallization is made from SiO.sub.2, Al.sub.2O.sub.3, TiN" and the claim also recites "or, preferably, SiN" which is the narrower statement of the range/limitation.

Claim 6 recites the broad recitation "the isolation layer is about 50 nm thin" and the claim also recites "preferably covers an area of approximately 20 .mu.m.times.40 .mu.m" which is the narrower statement of the range/limitation.

Claim 7 recites the broad recitation "the isolation layer's longitudinal extension is at least as long as... the mean diffusion lengths of the free carriers within the laser's active region" and the claim also recites "preferably longer than, the mean

diffusion lengths of the free carriers within the laser's active region" which is the narrower statement of the range/limitation.

See MPEP 2173.05(c) about the special case of "preferably".

4. Claim 8 recites the limitation "wherein the isolation layer's (11, 13) longitudinal extension is selected to avoid onsetting inhomogeneities in the P-I characteristics just above the laser threshold". It is unclear what structural limitations are being implied by that limitation.

***Claim Rejections - 35 USC § 102***

5. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

6. Claims 1, 3-5, 8 are rejected under 35 U.S.C. 102(b) as being anticipated by Arakawa et al (5,757,833). Arakawa et al discloses the claimed invention. Regarding claim 1 and its dependent claims, note figures 2c, 3c, 8 for the following features:

**FIG.2C**

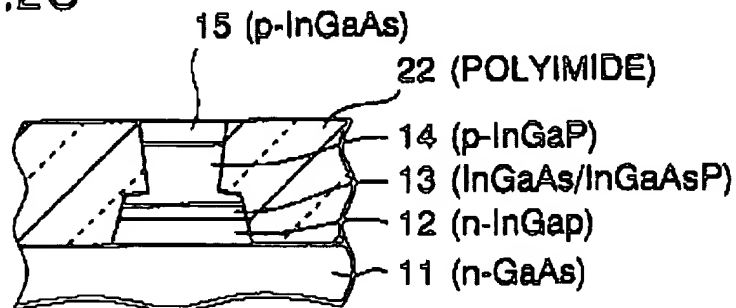


FIG.3C

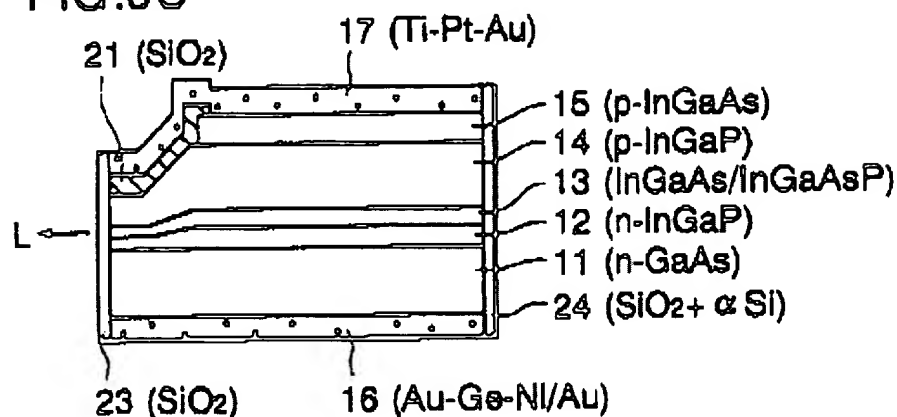
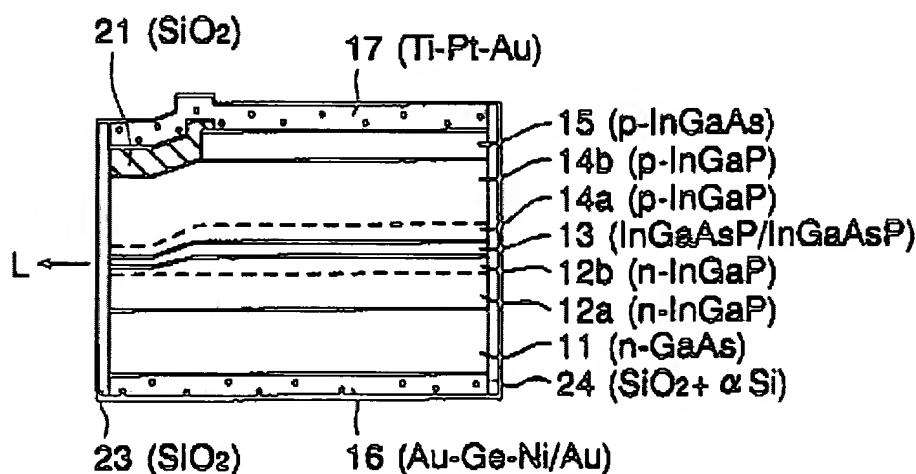


FIG.8



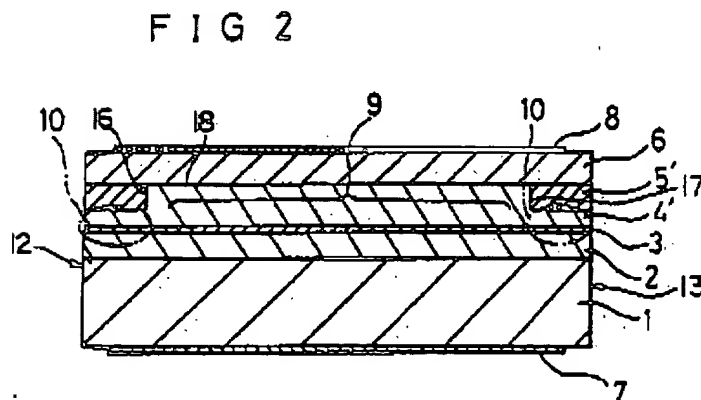
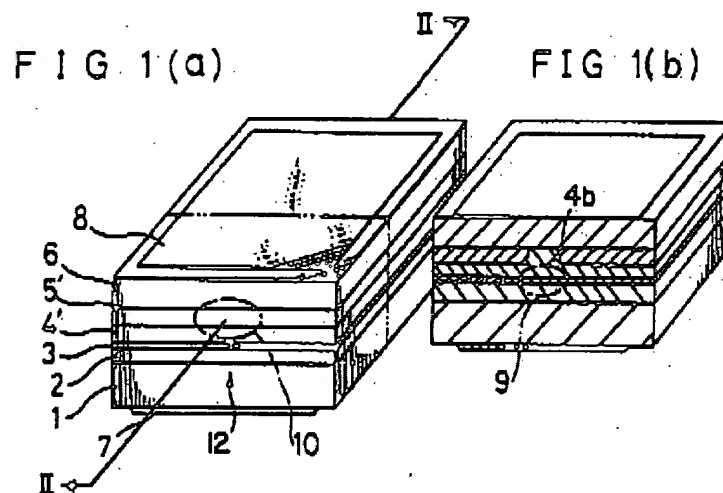
1. A semiconductor ridge waveguide laser diode including a semiconductor body (11) an active region (12, 13, 14) including a ridge (see col. 9 line 52, and col. 10 lines 27-30), front and back facets each with a mirror (23,24), a metallization (17) over said body and said ridge for injecting carriers into said active region (12,13,14) characterized by means (21) for limiting said injection of carriers by providing an unpumped section in the vicinity of said front and/or said back facet.

3. The laser diode according to claim 1, wherein the means for limiting the injection of carriers is an isolation layer (21) between the laser diode's active region (12, 13, 14) and the metallization (17).

4. The laser diode according to claim 3, wherein the isolation layer (21) between the laser diode's active region (12, 13, 14) and the metallization (17) is made from  $\text{SiO}_2$ ,  $\text{Al}_2\text{O}_3$ ,  $\text{TiN}$  or, preferably,  $\text{SiN}$ .

5. The laser diode according to claim 3, wherein the isolation layer (21) is extending under only a fraction of the area of the metallization (17).

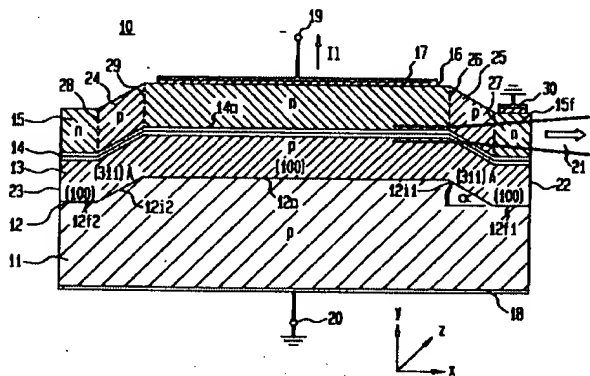
7. Claims 1-3, 5 are rejected under 35 U.S.C. 102(b) as being clearly anticipated by Mitsui et al (4,964,135). Mitsui et al clearly discloses the claimed invention.



least one of its ends as illustrated in FIG. 2. The current blocking layer 5' forms a rectifying junction with the layer 4', reducing the current injection and carrier re- 45 combination at the facets 12 and 13 compared to other laser structures.

8. Claims 1-2 are rejected under 35 U.S.C. 102(b) as being clearly anticipated by Gfeller et al (5,280,535). Gfeller et al clearly discloses the claimed invention.

**FIG. 1**



Still another object is to provide a laser diode of a 5  
rather simple structure that can be fabricated using  
conventional easy-to-control processes and that fulfills  
the dual purpose of terminating the active waveguide  
with a wide-bandgap zone and of preventing injected  
lateral currents from flowing into the mirror facet zone. 10

FIG. 2A

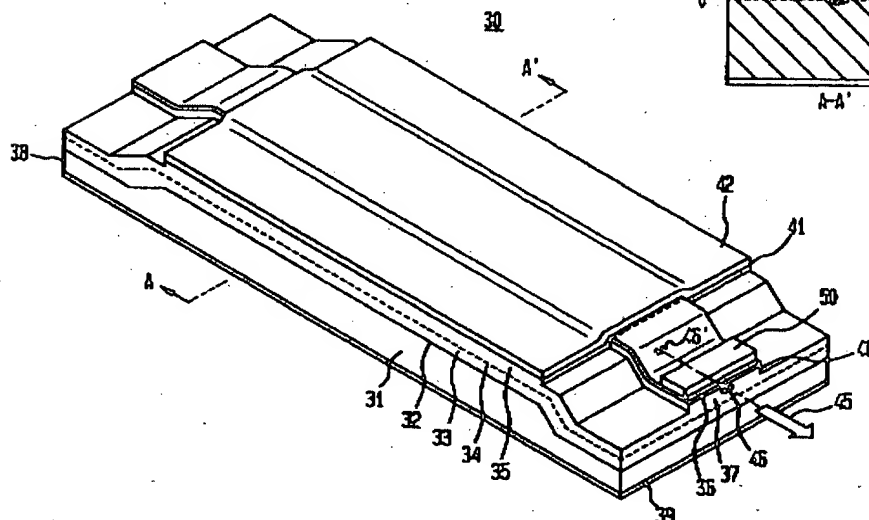
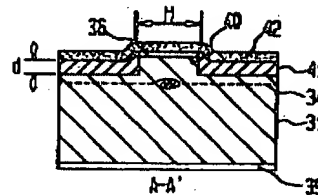


FIG. 28





***Claim Rejections - 35 USC § 103***

9. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

10. Claims 6-7 and 9-10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Arakawa et al as applied above. Arakawa has been discussed above except for the thickness of the isolation layer being about 50 nm, the isolation layer's extension being at least as long as the mean diffusion lengths of the free carriers within the laser's active region, the isolation layer's lateral extension being wider than the laser's waveguide ridge and narrower than that of the metallization, or the isolation layer being SiN instead of SiO<sub>2</sub>. It would have been obvious to one having ordinary skill in the art at the time the invention was made to the thickness of the isolation layer being about 50 nm, the isolation layer's extension being at least as long as the mean diffusion lengths of the free carriers within the laser's active region, or the isolation layer's lateral extension being wider than the laser's waveguide ridge and narrower than that of the metallization, since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. *In re Aller*, 105 USPQ 233.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to have the isolation layer being SiN instead of SiO<sub>2</sub>, since it has been held to be within the general skill of a worker in the art to select a known material

on the basis of its suitability for the intended use as a matter of obvious design choice.

*In re Leshin*, 125 USPQ 416.


### **Conclusion**

11. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Ishikawa et al (5,953,358) and Yu et al (6,373,875 B1) each teaches a semiconductor laser device.

12. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Quyen P. Leung whose telephone number is (703) 308-0545. The examiner can normally be reached on 8:30-5:00, M-F.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Paul Ip can be reached on (703) 308-3098. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 308-7724 for regular communications and (703) 308-7724 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

  
Quyen P. Leung  
Primary Examiner  
Art Unit 2828

QPL  
January 10, 2003